



AMENDMENTS TO THE CLAIMS

The following is a complete listing of the claims in the present application, which listing replaces all prior versions of the claims.

1. (Currently Amended) A method of transmitting electrical power from a power source to a remote load over a telephone twisted pair, comprising:

transmitting, from the power source, a plurality of electrical power feeds over a plurality of twisted pairs, each power feed limited to no more than 100 watts in a given twisted pair,

generating, at each of a plurality of remote, independent power converters, a voltage output based on receipt of a given power feed from a corresponding twisted pair;

combining the voltage outputs of each of the power converters to power a downstream remote load; and

protecting one or both of the power source and a given remote power converter against transient-induced damage,

wherein when one of the power feeds reaches an associated limit, the power source will reduce an output voltage and increase load so as to share the load among each of the power feeds.

2. (Original) The method of claim 1, further comprising:

limiting current over the twisted pair between of the power source and a given remote power converter so that feed power over a corresponding given twisted pair between the power source and given remote power converter does not exceed 100 watts.

3. (Original) The method of claim 1, wherein each remote power converter receives a feed of electrical power from the source over a single twisted pair.

4. (Previously Presented) The method of claim 1, wherein:
protecting is performed without employing a fuse or a voltage controlled shorting switch.
5. (Previously Presented) The method of claim 4, wherein the protecting step includes momentarily interrupting power on a given twisted pair during the transient and re-connecting power to the twisted pair after the transient has passed.
6. (Original) The method of claim 5, wherein effects of the transient do not reflect in an interruption of power to the load.
7. (Original) The method of claim 1, further comprising:
delaying, during a start-up operation, enabling of a low voltage to be output from at least one of the plurality of the remote power converters so as to synchronize the plurality of independent remote power converters at the load.
8. (Previously Presented) The method of claim 7, wherein said step of delaying is a function of at least one of a size of an energy storage capacitor provided in an input path to a given remote power converter, voltage thresholds set for the energy storage capacitor, loading presented by the load, resistive or impedance losses in a given twisted pair, voltage and current limits of a power limiter provided at the source to limit power to 100 VA, the number of remote power converters that are simultaneously active, and a degree of simultaneity of operation of the remote power converters.

9. (Original) The method of claim 1, wherein the plurality of output voltages are combined so as to power a downstream remote load in excess of 100 watts.

10. (Currently Amended) An arrangement for transmitting electrical power from a central office to a compact remote over a telephone twisted pair, comprising:

at least one isolated power converter at the source for transmitting electrical power feeds over a corresponding twisted pair, each power feed limited to no more than 100 watts in a given twisted pair,

a plurality of separate remote loads at the compact remote for producing a voltage output based on receipt of a given power feed from a corresponding twisted pair, the compact remote combining the voltage outputs of each of the remote power converters to power downstream electronics; and

a transient protection device provided in each twisted pair for protecting against transient-induced damage to power converters at one or both of the central office and the compact remote,

wherein when one of the power feeds reaches an associated limit, the power source will reduce an output voltage and increase load so as to share the load among each of the power feeds.

11. (Original) The arrangement of claim 10, further comprising:

at least one power limiter provided in each twisted pair between the at least one source power converter and a given remote power converter at the compact remote so that feed power over the twisted pair does not exceed 100 watts.

12. (Cancelled).

13. (Previously Presented) The arrangement claim 10, wherein the transient protection device does not include a fuse or a voltage controlled switch.
14. (Previously Presented) The arrangement claim 10, wherein the transient protection device is a series switch that disconnects a given power converter from a given twisted pair to momentarily interrupt power on the given twisted pair during the transient and re-connects the given power converter to the given twisted pair after the transient has subsided.
15. (Previously Presented) The arrangement claim 10, wherein the downstream electronics represents a load requiring in excess of 100 watts.
16. (Previously Presented) A method of apportioning electrical power received over a plurality of telephone twisted pairs at a plurality of independent remote power converters of a remote power source so not to exceed 100 watts of power on a given twisted pair, comprising:
 - controlling, from at least one power source, electrical power over each twisted pair so that electrical power on a given twisted pair does not exceed 100 watts, the at least one power source enforcing a power limitation on how much a given remote power converter can provide to power downstream electronics so as to provide cascaded sharing of power at the remote power source; and
 - delaying, during the start-up operation, enabling of a low voltage to be output from at least one of the plurality of independent remote power converters so as to synchronize the plurality of independent remote power converters, wherein the delay is a function of a size of an energy storage capacitor in an input path to a given remote power converter.

17. (Previously Presented) In load equipment adapted for receiving high-voltage electrical power from a central office source via at least one telephone wire twisted pair and converting the high voltage power to a low-voltage output for powering a load, the load equipment including a plurality of independent, isolated power converters, a method of synchronizing the power converters during start-up for sharing the load, comprising:

delaying, during the start-up operation, enabling of a low voltage to be output from at least one of the plurality of isolated power converters so as to synchronize the plurality of isolated power converters; wherein the

delay is a function of the size of an energy storage capacitor in an input path to a given load power source.

18. (Original) The method of claim 17, wherein said step of delaying is a function of at least one threshold for initiating a delay.

19. (Cancelled).

20. (Previously Presented) Load equipment adapted for receiving high-voltage electrical power from a central office source via at least one telephone wire twisted pair and converting the high voltage power to a low-voltage output for powering a load, the load equipment including a plurality of independent, isolated remote power converters, each remote power converter including a capacitor on an input thereto that is tied to a timer of the remote power converter for delaying, during a start-up operation, enabling of a voltage to be output from the corresponding remote power converter until the capacitor has fully charged, so as to synchronize the plurality of remote power converters during start-up.

21. (Currently Amended) ~~In an~~An arrangement for transmitting electrical power over a telephone twisted pair between a central office power source and a compact remote power source for powering remote electronics downstream from the compact remote power source, including a device for protecting against transient damage, comprising:

a series switch that disconnects power from the twisted pair to momentarily interrupt power on the given twisted pair during the transient and re-connects power to the given twisted pair after the transient has subsided.

22. (Original) The arrangement of claim 21, wherein

the central office power source includes at least one isolated source power converter for transmitting electrical power feeds over at least one twisted pair, and

the series switch is arranged between the two wires of the twisted pair at the at least one source power converter.

23. (Original) The arrangement of claim 21, wherein

the compact remote power source includes at least one isolated power converter for producing a voltage output based on receipt of a given power feed from a corresponding twisted pair, and

the series switch is arranged between the two wires of the twisted pair at the at least one remote power converter.

24. (Previously Presented) A central office power node for delivering electric power over a telephone twisted pair to a compact remote for powering remote downstream electronics, comprising:

at least one isolated source power converter for converting electrical power a source voltage to be transmitted over at least one twisted pair;

at least one power limiter provided in the at least one twisted pair for limiting electric power over the twisted pair to no more than 100 watts; and

a transient protection device provided in each twisted pair for protecting against transient-induced damage to a given isolated source power converter at one of the central office and compact remote.

25. (Previously Presented) A compact remote for receiving electrical power over at least one telephone twisted pair from a central office power supply so as to power electronics downstream from the compact remote, comprising:

a plurality of independent, isolated power converters for producing a voltage output based on receipt of a given power feed from a corresponding twisted pair, the compact remote combining the voltage outputs of each of the power converters to power downstream electronics, the given power feed received by each power converter limited to no more than 100 watts; and

a capacitor on an input thereto that is tied to a timer of at least one of the isolated power converter for delaying, during a start-up operation, enabling of a voltage to be output from the corresponding isolated power converter until the capacitor has fully charged, so as to synchronize the plurality of isolated power converters during start-up.

26. (Original) The compact remote claim 25, wherein the downstream electronics represents a load requiring in excess of 100 watts.